

REMARKS

In the Office Action, claims 1-24 were rejected and will remain pending in the present patent application. Reconsideration and allowance of all pending claims are respectfully requested.

Objections to the Drawings

The Examiner objected to the drawings because reference numerals 15a-d and 15f-g are not described in the detailed description of the drawing. Accordingly, as noted above, Applicant amended Figure 1 as indicated on the attached, hand-annotated sheet. In light of these amendments, Applicant respectfully requests withdrawal of the foregoing objections.

Objections to the Specification

The Examiner objected to the specification because the element "plunger 124" was incorrectly written as "plunger 142" on page 10, line 11 and as "plunger 128" on page 14, lines 4-5. Accordingly, as noted above, Applicant amended the specification to recite the plunger correctly as the plunger 124. The Examiner also objected to the specification for failing to provide proper antecedent basis for the claimed subject matter, specifically, the recitation of the location of the coil between the permanent magnets and the pump section. The Applicant stresses that the claimed subject matter is, in fact, disclosed by the specification, and refers the Examiner to Fig. 5 and the corresponding text on page 12, lines 15-27. If the Examiner requests the Applicant to provide further support for the claimed subject matter, then the Applicant will incorporate portions of the *original* claims into the detailed description of the present application. In light of these amendments and remarks, Applicant respectfully requests withdrawal of the foregoing objections.

Rejections Under 35 U.S.C. § 112

Claims 3, 10 and 17 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner rejected the foregoing claims based on the claim recitations that the coils are located between the permanent magnets and the pump section/assembly.

The Court of Appeals for the Federal Circuit has repeatedly addressed the issue of sufficiency of disclosure, and that Court's precedent controls in these issues. Indeed, the standard for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision of *Mineral Separation v. Hyde*, 242 U.S. 261, 270 (1916) in terms of the degree of experimentation needed to practice the claimed invention, and whether this degree of experimentation is undue or unreasonable. The Federal Circuit continues to employ this same standard. *In re Wands*, 8 U.S.P.Q.2d 1400, 1404 (Fed. Cir. 1998). A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 18 U.S.P.Q.2d 1331, 1332 (Fed. Cir. 1991). Moreover, it has long been settled that so long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claims, the enablement requirement under 35 U.S.C. § 112 is satisfied. *In re Fisher*, 166 U.S.P.Q. 18, 24 (CCPA 1970).

Although the Examiner may take exception to the terms used in the claims, he is reminded that the patentee may be his own lexicographer. *Ellipse Corp. v. Ford Motor Co.*, 171 U.S.P.Q. 513 (7th Cir. 1971), *aff'd*. 613 F.2d 775 (7th Cir. 1979), *cert. denied*, 446 U.S. 939 (1980). The terms employed in the claims are clearly described in the specification, which provides adequate teaching for one skilled in the art to make and use the claimed invention.

The Examiner argued that the lower portion of bobbin 190 interfaces directly with the plunger, and further that the coils are never located between the permanent magnets and the pump section/assembly. Again, the Applicant refers the Examiner to Fig. 5 and the corresponding text on page 12, lines 15-27. As illustrated by Fig. 5, the coils are clearly disposed in an intermediate region between the permanent magnets and the pump section/assembly. If the Examiner requests the Applicant to provide further support for the claimed subject matter, then the Applicant will incorporate portions of the *original* claims into the detailed description of the present application.

In light of the foregoing remarks, the Applicant respectfully requests withdrawal of the rejections to claims 3, 10 and 17 under 35 U.S.C. § 112.

Rejections Under 35 U.S.C. § 103

Claims 1-2, 4-9, 12-16 and 19-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hultman (4,787,823), in view of Martin (4,616,930). Claims 3-4, 10-11 and 17-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hultman, in view of Martin, and further in view of Lequesne (4,829,947). As discussed in detail below, the references cited by the Examiner do not teach or suggest, alone or in combination, the unique features recited in the foregoing claims. Moreover, the references teach away from one another regarding the application of a permanent magnet for fluid pumping applications.

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner

must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

Regarding claims 1-2, 4-9, 12-16 and 19-24, the Examiner specifically stated:

Although Hultman teaches most of the limitations of the claims including a permanent magnet used in a reciprocating pump (column 1, lines 26-33) and that electro-magnet 40 is used in place of the permanent magnet (column 5, lines 11-14), he does not disclose an embodiment using a permanent magnet. It was old and well known in the art of magnetics that a common magnetic field could be provided by either, an ordinary permanent magnet or it's art related equivalent, an electromagnet. Further it was well known in the art, that using a permanent magnet in place of electromagnet advantageously improved field stability, reduced power consumption and/or eliminated heating effects of the (Martin column 2, lines 58-66). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a permanent magnet in the pump disclosed by Hultman, to have advantageously improved field stability, reduced power consumption and/or eliminated heating effects.

Essentially, the Examiner has taken Official Notice of facts outside of the record that the Examiner apparently believes are capable of demonstration as being "well-known" in the art. Therefore, in accordance with M.P.E.P. § 2144.03, the Applicant hereby seasonably traverses and challenges the Examiner's use of Official Notice.

Specifically, the Applicant respectfully requests that the Examiner produce evidence in support of the Examiner's position as soon as practicable during prosecution and that the Examiner add a reference to the rejection in the next Official Action. If the Examiner finds such a reference and applies it in combination with the references cited, the Applicant further requests that the Examiner specifically identify the portion of the newly cited reference that discloses the allegedly "well known" elements of the recited claims 1-2, 4-9, 12-16 and 19-24, as discussed above, or withdraw the rejection.

The Applicant respectfully stresses that each of the independent claims 1, 8 and 15 recite a reciprocating fuel or fluid pump comprising drive and pump assemblies, wherein the drive assembly comprises both a permanent magnet and a coil assembly. The references cited by the Examiner, taken alone or in combination, are absolutely devoid of any teaching or suggestion of such a reciprocating fuel or fluid pump, which comprises both a permanent magnet and a coil assembly. In fact, the primary reference, i.e., Hultman, explicitly teaches away from the application of a permanent magnet for fluid pumping applications. Col. 1, lines 43-59. Hultman specifically states that the use of permanent magnets is, in practice, limited to applications where a relatively short stroke and small force is required, thereby making permanent magnets "*unsatisfactory for fluid pumping applications.*" Col. 1, lines 50-57 (emphasis added). Accordingly, the primary reference teaches away from the use of permanent magnets for fluid pumping applications, while the remaining references fail to obviate deficiencies of the primary reference. The independent claims 1, 8 and 15 are believed to be patentable over the references cited, taken alone or in combination.

Regarding dependent 2, 4-7, 9, 12-14, 16 and 19-24, Applicant stresses that these claims are patentably distinct by way of their dependencies on their respective base claims and by way of further unique features recited in each respective claim.

Regarding claims 3-4, 10-11 and 17-18, which all depend from the independent claims 1, 8 and 15, the Examiner specifically stated:

Although Hultman teaches most of the limitations of the claims including a reciprocating fuel pump with a permanent magnet, he does not disclose at least two permanent magnets in different locations. Lequesne, disclosing a magnetic actuator, specifically teaches at least two permanent magnets 37-38 located in different positions (see Figures 1-3). Lequesne teaches the permanent magnets and their locations advantageously completed the magnetic circuit (column 5, lines 58-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the permanent magnets taught by Lequesne, in the pump disclosed by Hultman, to have advantageously completed the magnet circuit.

Again, the Applicant respectfully stresses that the references cited by the Examiner, taken alone or in combination, do not teach or suggest the fuel or fluid pump recited by the present claims. The primary reference discloses an electromagnetic linear motor and pump apparatus, while the Martin reference teaches an optically biased twin ring laser gyroscope and the Lequesne reference teaches an actuating device for valves of an internal combustion engine. There is absolutely no suggestion or motivation to combine or modify these references to attain the presently technique, as recited by the claims. The primary reference teaches away from the application of permanent magnets, while the remaining references are completely unrelated to pumping systems. Accordingly, the foregoing dependent claims are believed to be patentable over the references cited, taken alone or in combination.

As discussed above, the present claims are believed to be patentable over the Hultman, Martin, and Lequesne references, and that which is allegedly "well known in the art." The cited references, taken alone or in combination, fail to teach or suggest the unique features recited in the foregoing claims. Moreover, the cited references provide absolutely no suggestion or motivation to combine the references, but rather the references teach away from one another. For these reasons, the Applicant respectfully requests the Examiner to withdraw the rejections of claims 1-24 under 35 U.S.C. § 103.

Attachment

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version With Markings To Show Changes Made**" A marked-up version of the changes made to the drawings is also attached hereto, and captioned **Amendments To Drawings**.

Conclusion

The Applicant respectfully submits that all pending claims should be in condition for allowance. However, if the Examiner believes certain amendments are necessary to clarify the present claims or if the Examiner wishes to resolve any other issues by way of a telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE DRAWINGS

Applicant hereby amends Figure 1 as indicated on the attached, hand-annotated sheet.

IN THE SPECIFICATION

Applicant hereby amends the specification by replacing the original paragraph on page 10, lines 1-17 with the following amended paragraph:

Figure 3 illustrates the pump and nozzle assembly of Figure 2 in an actuated position. As shown in Figure 3, upon application of energizing current to the coil 116, the coil, bobbin 114, extension 118, and drive member 122 are displaced downwardly. This downward displacement is the result of interaction between the electromagnetic field surrounding coil 116 by application of the energizing current thereto, and the magnetic field present by virtue of permanent magnets 108 and 110. In the preferred embodiment, this magnetic field is reinforced and channeled by core 112. As drive member 122 is forced downwardly by interaction of these fields, it contacts plunger 124 to force the plunger downwardly against the resistance of spring 130. During an initial phase of this displacement, plunger ~~142~~ 124 is free to extend into pump chamber 148 without contact with valve member 144, by virtue of gap 146 (see Figure 2). Plunger ~~142~~ 124 thus gains momentum, and eventually contacts the upper surface of valve member 144. The lower surface of plunger 124 seats against and seals with the upper surface of valve member 144, to prevent flow of fluid upwardly through passage 126 of the plunger, or between the plunger and aperture 138 of the pump section. Further downward movement of the plunger 124 and valve member 144 begin to compress fluid within pump chamber 148, closing inlet check valve 154.

Applicant hereby amends the specification by replacing the original paragraph on page 10, line 27 – page 11, line 11 with the following amended paragraph:

As will be appreciated by those skilled in the art, upon reversal of the polarity of the drive or control signal applied to coil 116, an electromagnetic field surrounding the coil will reverse in orientation, causing an oppositely oriented force to be exerted on the coil by virtue of interaction between this field and the magnetic field produced by magnets 108 and 110. This force will thus drive the coil, and other components of the reciprocating assembly back toward their original position. In the illustrated embodiment, as drive member 122 is driven upwardly back towards the position illustrated in Figure 1, spring 130 urges plunger ~~128-124~~ upwardly towards its original position, and spring 158 similarly urges valve member 144 back towards its original position. Gap 126 is reestablished as illustrated in Figure 1, and a new pumping cycle may begin. Where a nozzle such as that shown in Figures 2 and 3 is provided, the nozzle is similarly closed by the force of spring 170. In this case, as well as where no such nozzle is provided, or where an outlet check valve is provided at the exit of pump chamber 148, pressure is reduced within pump chamber 148 to permit inlet check valve 154 to reopen for introduction of fluid for a subsequent pumping cycle.